

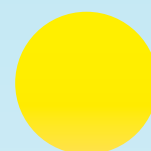


Llywodraeth Cynulliad Cymru
Welsh Assembly Government

www.cymru.gov.uk

A Low Carbon Revolution –
**The Welsh Assembly Government
Energy Policy Statement**

March 2010





Contents

4	Cabinet foreword
5	The Welsh Assembly Government Energy Policy Statement
6	1. Overview
7	1.1 The challenge
9	1.2 The opportunity
10	1.3 The role of the Welsh Assembly Government
12	Main actions
12	2. Action on energy efficiency and small scale renewables
13	3. Action to produce low carbon electricity on a large scale
13	3.1 Low carbon renewables
13	a) Marine
13	i. offshore wind
14	ii. tidal range
14	iii. tidal stream and wave energy
14	b) Onshore wind
15	c) Hydropower and geothermal schemes
15	d) Bioenergy/Waste
16	3.2 Low carbon nuclear power
16	3.3 Low carbon large scale fossil fuel power generation with carbon capture and storage (CCS)
17	4. Capturing the benefits
19	5. Appendix 1: Wales' 'sustainable' renewable energy potential to 2020/2025
20	6. Online resources to accompany the energy policy statement
20	7. Glossary of terms
23	8. List of footnotes



Cabinet foreword

Climate change is the greatest environmental, economic and social challenge facing the planet. Unless the global emissions of carbon dioxide and other greenhouse gases from energy generation and other human activities peak by around 2015 and then rapidly diminish, the world will probably see a global temperature rise of 4°C by around 2060 resulting in famine and droughts in many parts of the world, significant sea level rises, and an increasing risk of further catastrophic climate changes.¹

Our future well-being, both material and social, will be dependent on achieving sufficient supplies of affordable low carbon energy. This move to a low carbon economy is an essential part of our commitment as a Government to sustainable development. Done successfully it will strengthen our economic well-being, improve the environment and help to address key social issues such as fuel poverty.

There is already the potential in Wales for some £50 billion of investments in large renewables and other low-carbon electricity projects alone over the next 10-15 years. We will also be investing heavily over the next years in domestic energy efficiency, community-scale renewables and alleviating fuel poverty with the prospect of attracting further significant investment into Wales through the new Wales Strategic Energy Performance Investment Programme, *arbed*. All this will bring opportunities for new jobs and skills across Wales and will strengthen the steps we are already taking to regenerate communities and improve housing.

In this policy statement, we set out our ambitions for low carbon energy in Wales. The statement builds on the results of our consultations over the last year on the Renewable Energy Route Map and the Bioenergy Action Plan for Wales. It draws on the work of the Wales Climate Change Strategy, the National Energy Efficiency and Savings Plan, the Green Jobs Strategy and the Ministerial Advisory Group on Economy and Transport's report on "The Energy Sector". This statement also reflects the UK policy position, the work of the UK Climate Change Commission and the UK National Policy Statements on Energy and Renewables.

Wales once led the world in carbon-based energy. Our goal now is to do the same for low carbon energy. This is a challenging but exciting and vital agenda. We are committed to work with all sectors and across all aspects of the Assembly Government's responsibilities within a very strong sustainable development framework in order to make it a reality.

Welsh Assembly Government Cabinet

March 2010

¹ Global carbon dioxide gas concentration is already at more than 387 ppm compared to 280 ppm 200 years ago at the start of the industrial revolution. See <http://www.occ.gov.uk>



The Welsh Assembly Government Energy Policy Statement

1. Overview

Throughout the 19th century, it could be argued that Wales did more than any other country to give momentum to the industrial revolution through its steel operations and coal mines. A century ago, the price of world coal was set in Cardiff. Wales has strongly participated in many energy transformations over the last 100 years including those associated with coal and gas (both in south and north Wales), with oil (with focal points ports in Milford Haven and Liverpool Bay) with two nuclear power stations in north Wales and with Europe's largest pumped storage station at Dinorwig. These transformations have given us secure, resilient and diverse sources of energy and a strong heavy industrial sector providing high added value employment and fostering considerable expertise in our colleges.

Yet as the world has developed, carbon dioxide and other greenhouse gases emitted by mankind's activities have dramatically increased the concentration of greenhouse gases in our planet's atmosphere leading to significant global warming. If the world continues on its present trajectory for the use of fossil fuel, with more and more of the world's six, soon to be nine, billion inhabitants seeking a reasonable standard of living, those greenhouse gas concentrations will continue to increase at an alarming rate.

These activities, which have enabled a growing prosperity, have seen a typical person in Wales, as in the rest of the UK, consume around 125 kilowatt hours per day per person (kWh/d/p) of energy, with approximately one third of this on transport, one third on heat and one third on electricity – with the domestic transport element alone doubling over the last 40 years.

Globally we have already seen around a 1°C rise in average global temperature, but the latest climate change science indicates that unless we quickly reduce our emissions of greenhouse gases, the world will probably be another 3°C hotter by 2060 and there will be much higher risks of catastrophic global climate changes.

At the same time, supplies of fossil fuels are under growing pressure, with the prospect of higher energy prices and increasing concerns about the security of supply of energy.

There is therefore both a moral and a practical imperative to move rapidly to a situation where we are much less dependent on fossil fuels – a low carbon economy.

This Assembly Government statement explains what we will do and what we want others to do to make our ambition for low carbon energy a reality.

First, we will maximise energy savings and energy efficiency in order to make producing the majority of the energy we need from low carbon sources more feasible and less costly.

Second, our energy needs in a modern society will remain considerable, and must be met securely from low carbon sources. We will move to resilient low carbon energy production via indigenous (and thus secure) renewables, on both a centralised and localised basis.

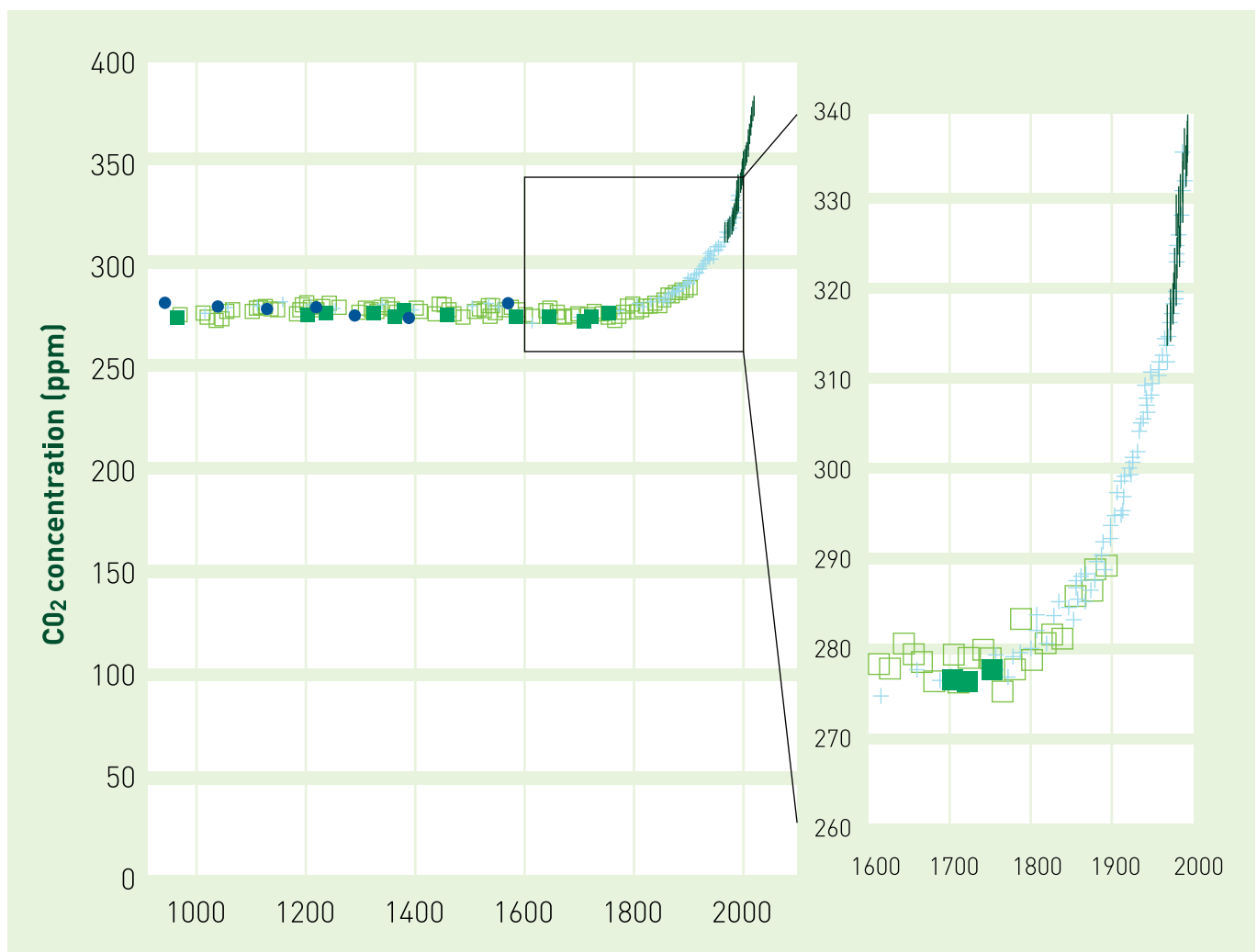
Third, we will ensure that this transition to low carbon maximises the economic renewal opportunities for practical jobs and skills, strengthens and engages our research and development sectors, promotes personal and community engagement and helps to tackle deprivation and improve quality of life.

Based on Wales' natural advantages in areas such as wind and marine renewable resources, our **aim** will be to renewably generate up to twice as much electricity annually by 2025 as we use today and by 2050, at the latest, be in a position where almost all of our local energy needs, whether for heat, electrical power or vehicle transport, can be met by low carbon electricity production.

1.1 The challenge

Our Climate Change Strategy² has set out the huge challenges the planet faces in avoiding catastrophic climate change. Figure 1 provides a reminder of the scale of impact currently projected for greenhouse gases in the atmosphere.

Figure 1: Carbon dioxide (CO₂) concentrations (in parts per million) for the last 1000 years³



In addition to the threat posed by climate change, we also face increasing uncertainty about the future availability of fossil fuels as more countries compete for them and when a number of the remaining reserves face significant geopolitical issues. The United Nations Framework Convention on Climate Change Fifteenth Conference of Parties took place in Copenhagen from 7 to 18 December 2009. Although the final declaration did not produce the fair, ambitious and legally binding deal that the world needs, we must regard it as a starting point and focus positively on the next steps towards

² http://wales.gov.uk/topics/environmentcountryside/climate_change/tacklingchange/strategy/walesstrategy/?lang=en

³ David J.C. Mackay. *Sustainable Energy – without the hot air*. UIT Cambridge, 2008. ISBN 978-0-9544529-3-3. Available free online from www.withouthotair.com. p.6.

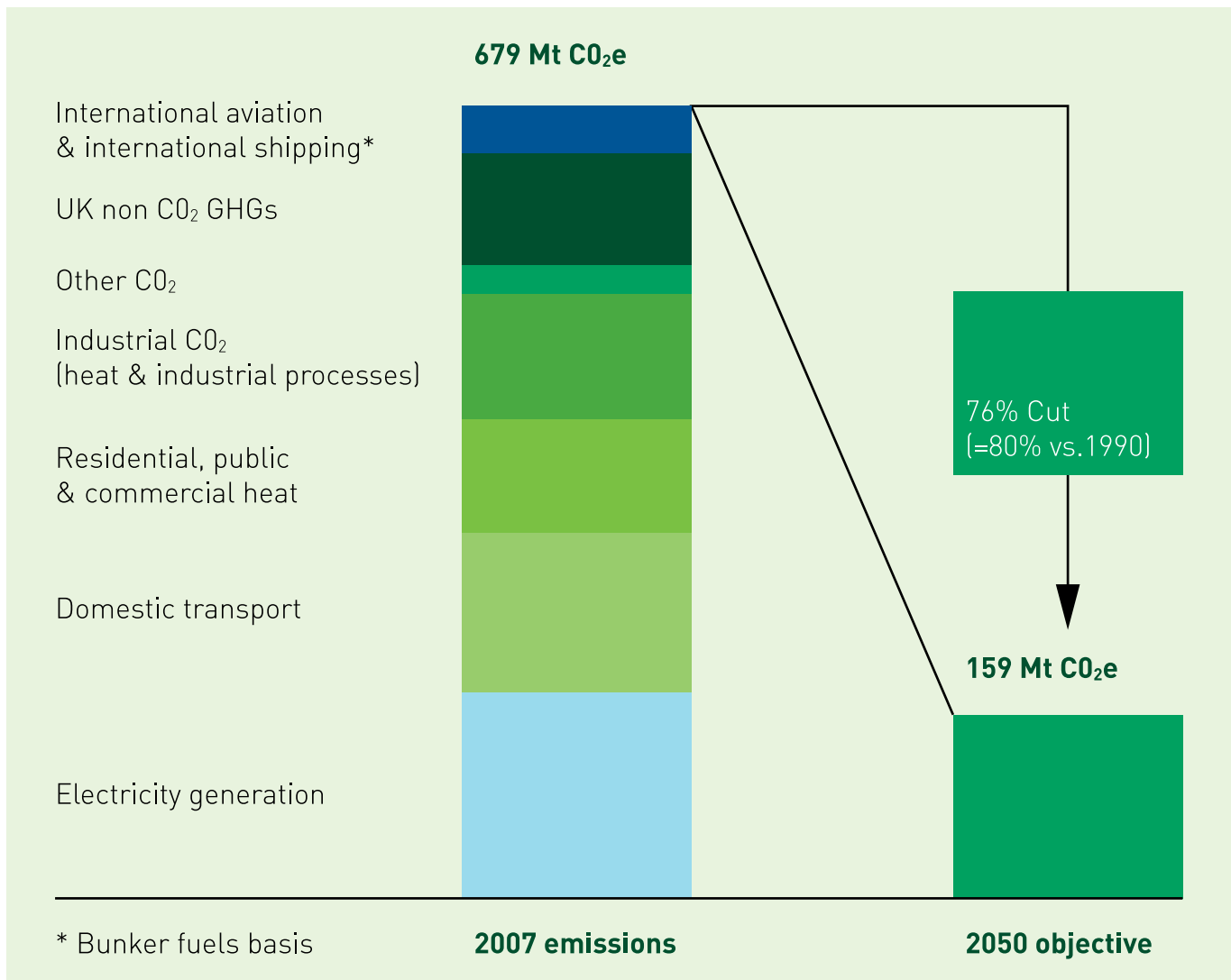


securing a strong deal and continue to take ambitious action to tackle climate change. Our commitment to action on climate change here in Wales is based on a scientific imperative to act urgently to reduce emissions.

That scientific imperative remains and the absence of an international agreement should not deflect us from being as ambitious as possible. Indeed, the importance of demonstrating continued leadership on climate change is perhaps greater than ever.

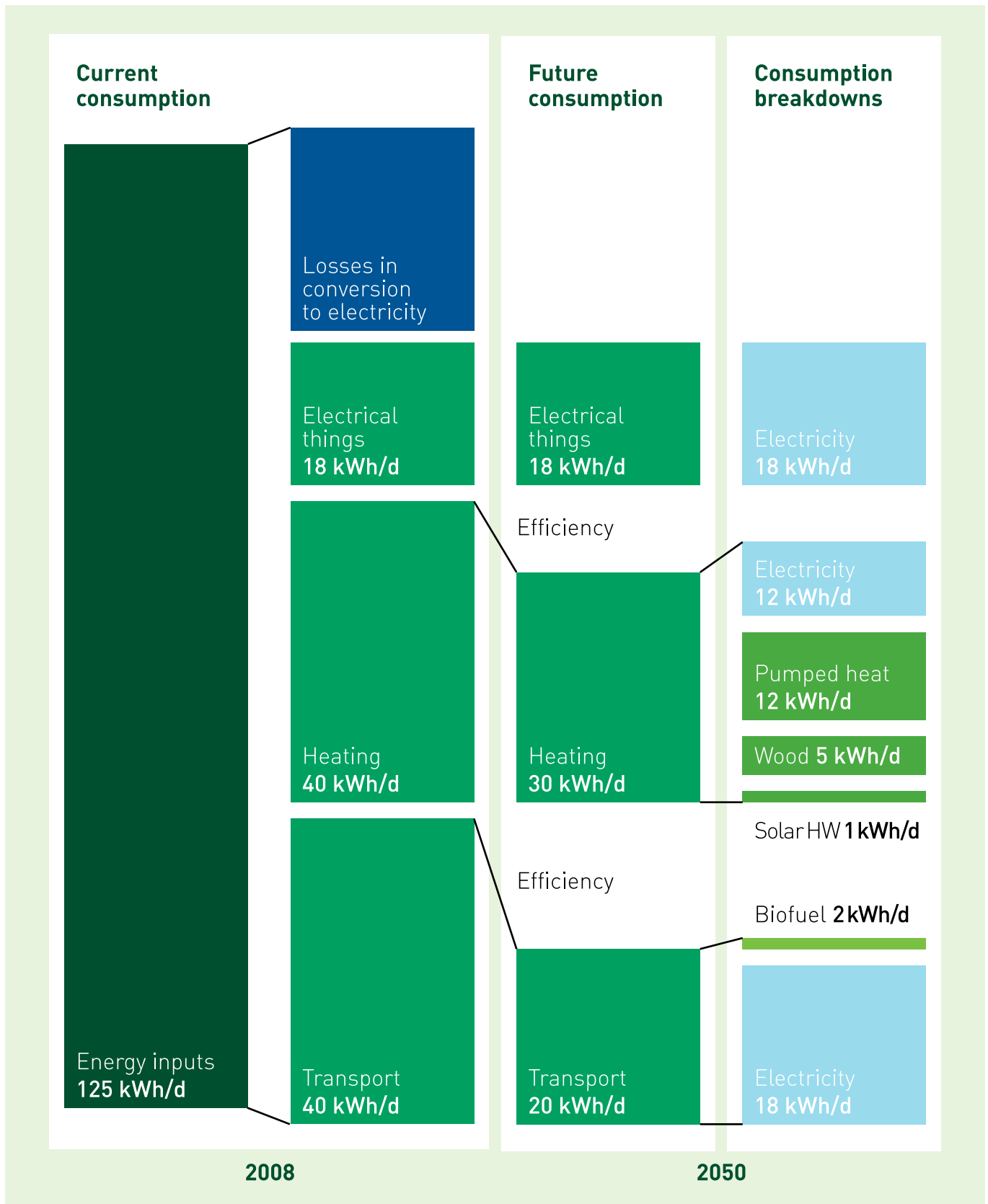
To address climate change, the UK Government and the international community have set a number of targets, with the goal of reducing emissions by at least 80% by 2050. What this means in practice is illustrated below (Figure 2).

Figure 2: UK Climate Change Committee analysis of the UK's current and maximum 2050 carbon emissions by energy uses



From a personal consumption perspective, Figure 3 overleaf illustrates the current position and what a predominantly electrical energy based system could look like in 2050.

Figure 3: Current consumption per person in 2008 (left two columns), and a future consumption plan, along with a possible breakdown of fuels (right two columns)⁴



⁴ David J.C. Mackay. *Sustainable Energy – without the hot air*. UIT Cambridge, 2008. ISBN 978-0-9544529-3-3. Available free online from www.withouthotair.com. P204



Figure 5 provides a table of current consent bodies for energy projects in Wales, and the proposed consenting bodies from 1 April 2010 on the establishment of the Infrastructure Planning Commission. Further information on consenting powers for energy installations in Wales is presented in the technical annexes which are available online at:

<http://wales.gov.uk/topics/environmentcountryside/energy/>

Figure 5: Current and proposed consent bodies for electricity installations

Installation size	Current consent body	Future consent body
>50 MW onshore	Secretary of State for Energy & Climate Change	Infrastructure Planning Commission
<50 MW onshore	Local authorities	Local authorities
>1 MW offshore	Secretary of State for Energy & Climate Change	Infrastructure Planning Commission
	Welsh Assembly Government (Under Transport & Works Act)	Marine Management Organisation & Welsh Assembly Government
<1 MW offshore	Welsh Assembly Government	Marine Management Organisation & Welsh Assembly Government

While we continue to believe it is anomalous that consents for large power stations are executively devolved to Scotland and not to Wales, we will work positively with the future Infrastructure Planning Commission and others to facilitate appropriate energy development in Wales in accordance with this statement. In particular we will support projects that meet sound sustainable development criteria (ref: Technical Annex 5) – recognising that for some technologies, such as nuclear power and large tidal range projects such as those under consideration for the Severn Estuary, what constitutes sustainable development is matter of considerable debate

This statement draws on the results of consultation on our Renewable Energy Route Map, our Bioenergy Action Plan and our Ministerial Marine Energy Policy Statement and reflects the latest UK Government policy position, the Economy and Transport Ministerial Advisory Group Report and UK Climate Change Committee and Wales Climate Change Commission deliberations.

These policies will be implemented through a rolling programme of sector actions and through strong public communication initiatives as part of our climate change programme. Further information about the devolved legal powers of the Welsh Assembly Government can be found in Technical Annex 3.

- liaising closely with DECC, BIS, UKTI and the UK Technology Strategy Board in international technology work, participating in the UK Energy Research Partnership⁹ and building on our links abroad;
- using Assembly Government sites and premises as exemplars for a low carbon future;
- further supporting the growth of renewable companies located in Wales – with companies such as Infinigy, Windpower Wales, Quiet Revolution, Dulas and ECO2 already showing the way;
- promoting Wales' position as a low carbon nation with greater resilience against fuel supply interruptions or price increases;
- working with local authorities to deliver the low carbon agenda in the exercise of their responsibilities;
- linking investments to community renewal and regeneration allowing individuals and communities to be more self-supporting;
- tackling fuel poverty at its roots through our major investment programmes;
- underpinning all this through the Wales Spatial Plan low carbon regions project.

The potential economic benefits of being at the forefront of transition to low carbon has already been flagged in the Wales Green Jobs Strategy consultation¹⁰, the new Whitehall Low Carbon Industrial Strategy¹¹ and in the WAG Ministerial Advisory Group on Economy and Transport's recent energy and transport sector development reports.

⁹ <http://www.energyresearchpartnership.org.uk/>

¹⁰ <http://wales.gov.uk/topics/businessandconomy/publications/greenjobs>

¹¹ <http://interactive.bis.gov.uk/lowcarbon/2009/07/low-carbon-industrial-strategy>



Appendix 1: Wales' 'sustainable' renewable energy potential to 2020/2025

Technology	Capacity either operational or consented (GW)*	Total capacity (GW)	Load factor (%)	Annual energy output (TWhr)	Deliverable in main by	kWh/d/p in Wales
Onshore wind	0.7	2	30	5	2015/17	4.5
Offshore wind	0.9	6	40	21 (Of which 20% is shared with England)	2015/16	15.5
Biomass (electricity)	0.5	1	75	7	2020	3 imports and 3 indigenous
Tidal range	0	8.5	25	18 (Of which 50% is shared with England)	2022	8
Tidal stream/ Wave	0	4	25	9	2025	8
Local electricity generation (mainly PV/ wind/hydro)	Data currently not available	1	10	1	2020	1
Electricity subtotals in Wales	2 GW	22.5GW	-	48		43

NB. Wales' current annual electricity consumption is around 23 TWhr

* Capacity either operational or consented as of 1 October 2009

